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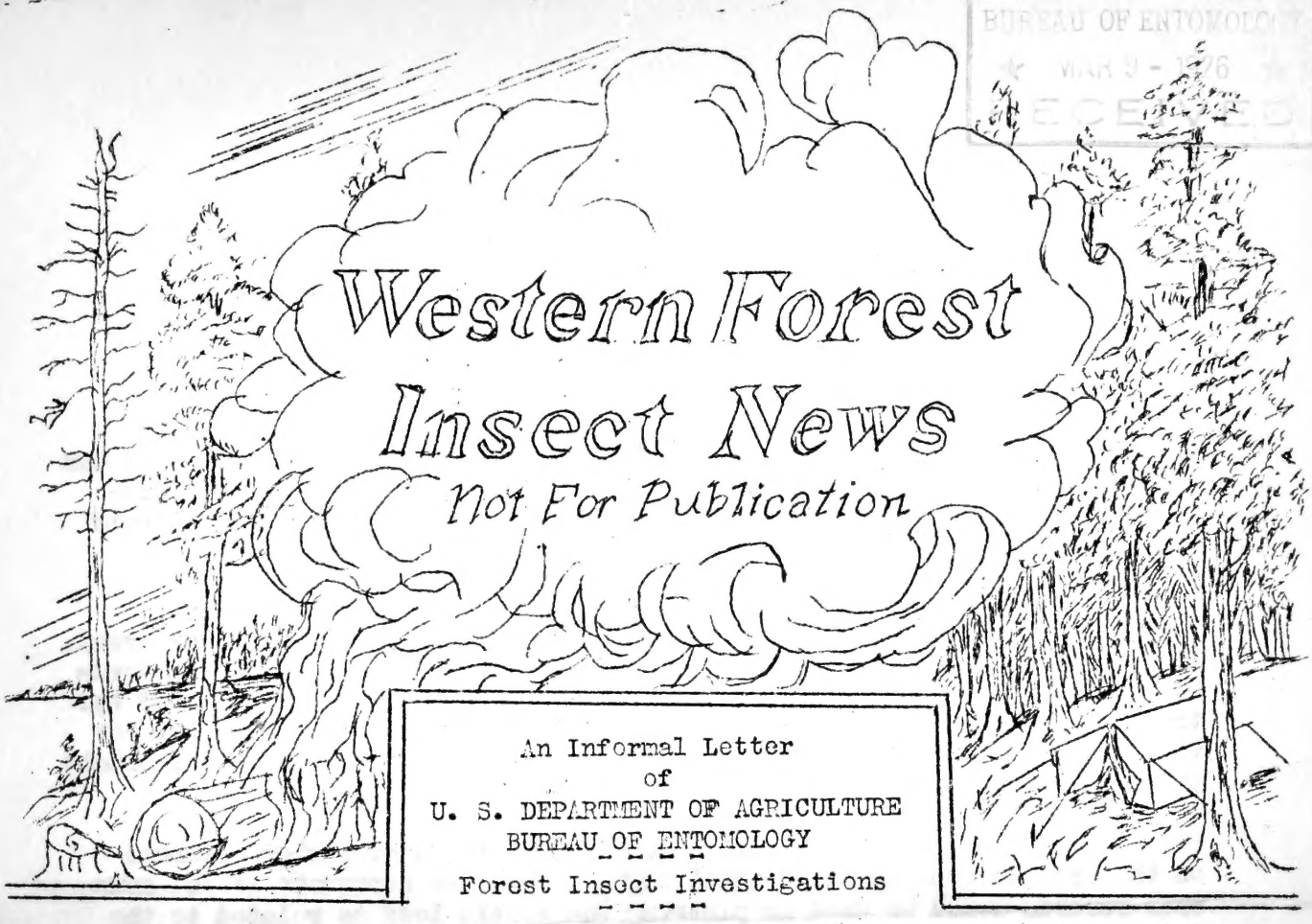


Western Forest Insect News

Not For Publication

An Informal Letter
of
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
Forest Insect Investigations

P. O. Box 3010, Stanford University, Calif. - March 1, 1926

BEETLES HIT 'EM WHEN THEY'RE DOWN.

The western pine beetle appears to lurk in our western yellow pine forests waiting for the lowered resistance of some victim, just as diphtheria, cold germs, and tuberculosis often lurk in the human system for many years before getting a foothold. When conditions are favorable and the tree's growth is vigorous and healthy, the beetles find very few victims regardless of the number of beetles present on the area. With a lowered resistance of the trees due to unfavorable climatic or other environmental conditions, the quantity of infestation which develops will largely depend upon the beetle population ready and waiting to do their damage. Thus the quantity of beetle infestation which develops on an area depends upon the interrelationship of the two factors (1) resistance of host and (2) beetle population.

It is probable that for this reason the control work directed against epidemic infestations of the western pine beetle gives better results than control directed against endemic infestations. The limiting of the beetle population in the first instance is of far greater importance than limiting it when the trees are already in a condition to withstand attacks.

The mountain pine beetle, the Black Hills beetle and some others are more like the"flu". They take 'em all, just as they come.

F.P.Keen.

DEFOLIATION BY PINE MOTH CAUSES BARKBEETLE EPIDEMIC.

A careful study of the causes underlying the rapid increase in the barkbeetle infestation in the timber of the Long Bell Lumber Company on the Klamath Indian Reservation, southern Oregon, suggests that the epidemic has resulted indirectly from previous defoliations of the trees by the caterpillars of the pine moth, Coloradia pandora. The infestation increased from a low normal status in 1922 to a highly epidemic condition in 1924, a period of two years.

Since 1919 the moth caterpillars have repeatedly severely defoliated the yellow pine on the control area and on adjacent check areas. These defoliations, repeated annually for four years previous to the barkbeetle epidemic, had caused a loss of as high as 90% of the needles of the trees attacked on certain areas. The studies made indicate that the low vitality of the heavily defoliated trees has been the greatest single factor in the rapid increase of the barkbeetle infestation.

One of the most severely defoliated stands of timber occurred on the area covered by the control work. This was fortunate as the control records could be used in platting the beetle loss as related to the defoliated area. Since the area had been examined a number of times previous to the control work the limits of the severely defoliated stand were already known.

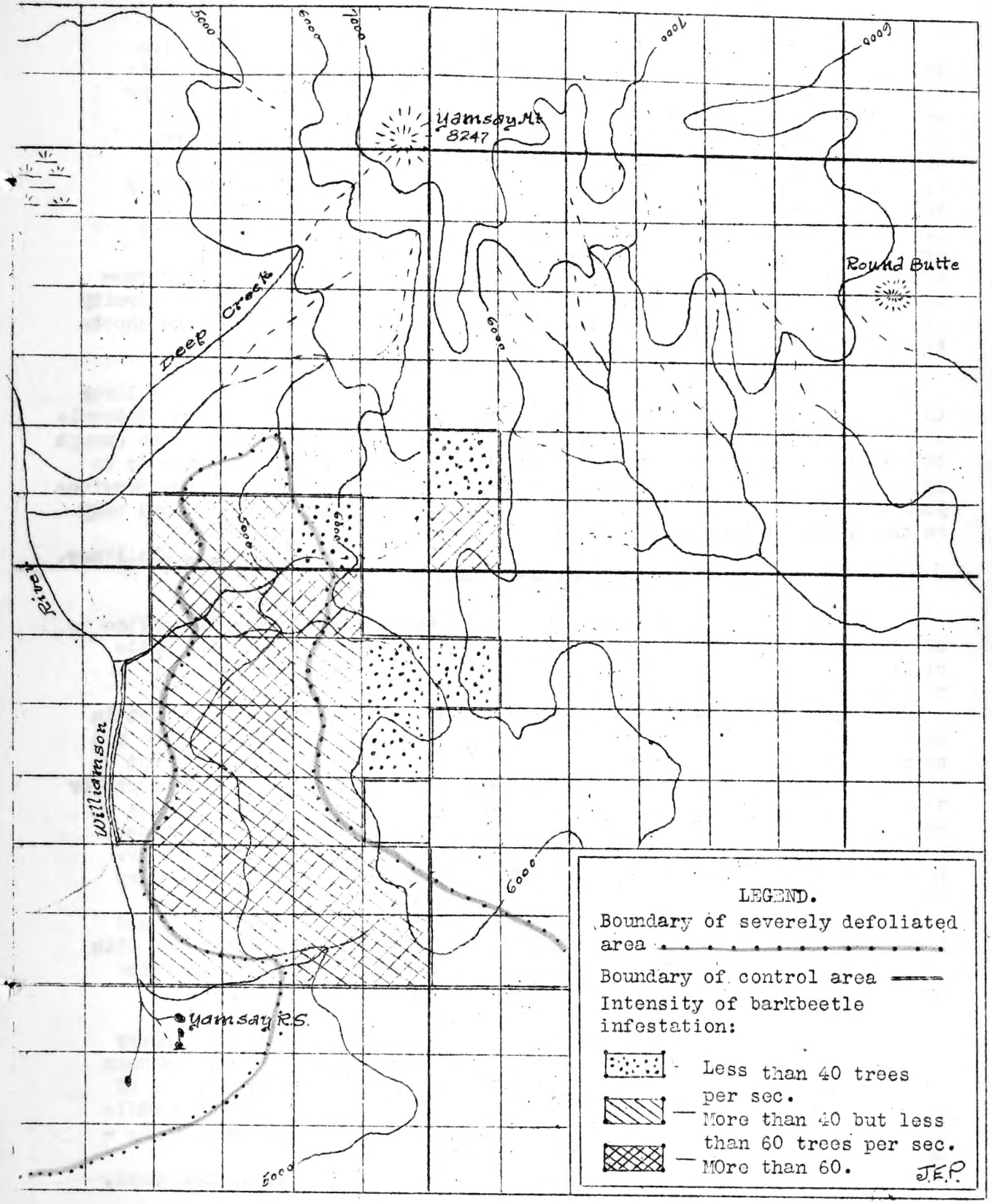
A map prepared from the data obtained shows nearly perfect positive correlation between heavy beetle losses and severe previous defoliations. The high beetle loss was so closely confined to the area severely defoliated that there is little doubt that the defoliated trees were attacked by the beetles in preference to the more vigorous, surrounding stands.

Examinations made in other areas of the same region reveal similar conditions. Wherever defoliations were severe enough to cause a loss of 80% or more of the needles, barkbeetles are now devastating the stands.

The accompanying map chart shows the correlation of the beetle loss and the defoliation by the pine caterpillar.

J. E. Patterson.

MAP OF PART OF KLAMATH INDIAN RESERVATION SHOWING CORRELATION BETWEEN COLORADIA PANDORA DEFOLIATIONS AND SUBSEQUENT BARKBEETLE INFESTATION.



SPITTLE INSECT INJURY.

Spittle insect injury was very prevalent on young white pine in the northeast last summer. It is believed that the spittle insects attack rather spasmodically and the past two or three years have apparently been favorable for their development. From all over the New England states reports have come in that the yellowish spongy injury, which is so characteristic, was very abundant. Natural reproduction seemed to be injured to a greater extent than planted stock. Just why this is, is not certain. Possibly it is because of the fact that planted stock is usually set out in old fields and there is sufficient grass and weeds present to supply the natural food material for the spittle insect. In timber land in the northeast where natural reproduction comes in there is little or no grass as a rule and there is a scarcity of this food material. Thus the migration to the young tender pine shoots takes place.

The yellowish spongy injury usually is found at the base or lower third of the present year's leader, although it often extends to the laterals also and at times a lateral only is injured. If the injury is severe enough the weight of the upper portion of the leader is sufficient to cause it to split and bend over. Unlike the weevil injury, which occurs in the previous year's growth and kills at least two year's growth, this injury occurs only on the growth of the present year.

H.J. MacAloney.

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Mr. MacAloney sent the above note through the Washington office and it seems worth while making a few comments. In August, 1925, while visiting Harvard Forest in company with a number of men interested in forestry, our attention was attracted by the unusual abundance of this peculiar spittle bug injury. At the time no one in the party was certain as to the causal agency. Dr. Fisher was under the impression that he had heard it spoken of as the spittle bug and Dr. Spaulding said he did not believe it was a fungus. While Mr. MacAloney was in the office this winter looking over records of the white pine weevil, he ran across references to this injury in the notes of Dr. Kraus of 1908. Later the correspondence between Dr. Hopkins and Dr. Kraus was referred to and in a letter of Dr. Hopkins of July 21, 1908, the following sentence relating to this injury occurs:

"This was investigated quite thoroughly at Brunswick (Me.) and I was pleased to find that spittle insects were intimately associated with it, * * * it is probable that the adults, either from ovipositing in the twigs or puncturing it with their beaks, produce it later on".

The following year Dr. Kraus definitely associates this injury and the spittle bug. There is a good moral here - quite frequently when we think we are doing something new we can refer to the older records of the Division and find our work duplicated. It would be well worth while for all of us to help prevent the dust from accumulating on these files - thus keeping both the files and ourselves in better trim.

F. C. Craighead.

PANDORA EPIDEMIC DECLINING IN SOUTHERN OREGON.

Examinations made during the season of 1925 in the timber stands of the Klamath Indian Reservation of Southern Oregon indicate that the epidemic defoliations by the caterpillars of the pandora moth are declining. It seems probable that the defoliator will entirely disappear from the Klamath area within the next few years. Many of the defoliated trees are now recovering from the past defoliations and may soon regain their former healthy condition. The recovery of the trees from the defoliations should be followed by a decline of the barkbeetle epidemic.

J.E. Patterson.

MEASURING INCREMENT BORINGS.

For the last two or three years we have been measuring increment borings to study the effects of Gipsy Moth defoliation upon tree growth. We have worked with some twenty or more species of trees, most of which are deciduous, and the most important of which, for our purpose, are the oaks. Very quickly we came to the conclusion that the boring was not satisfactory without some special treatment, and that in order to properly date and measure the rings it would be necessary to use transparent sections. We finally succeeded in making such sections for the full length of the borings, from 4 to 7 centimeters in length and from 0.015 to 0.020 mm. in thickness, which included anywhere from 20 to 70 annual rings, as the case might be. These have proved excellent material for study.

For measuring these sections we have used a compound microscope (not a binocular) already fitted with a mechanical stage which is provided with scales graduated to 1.0 mm. and having verniers reading to 0.1 mm. The only necessary addition to the instrument was a cross-hair placed in the eyepiece in the way described by Mr. Person.

Since our work has been done entirely with thin sections mounted in balsam on the usual slides, no special adaptation of the stage was required. If it is desired to measure the original boring there would seem to be no difficulty in constructing a light carrier provided with a clamp similar to that used on your comparator, but mounted on a base the size of the ordinary slide. All of this could be placed upon the stage of the microscope like any other slide.

Our experience has led to the belief that measurements read to a greater degree of precision than 0.1 mm. are impracticable for our purpose, especially in view of the great variations which are liable to occur in the width of the rings at different points in the circumference. Our 0.1 mm. is not far from Mr. Evenden's one three-hundredth of an inch.

In our studies it is essential to date the rings of growth in order to connect them with records of defoliation for the same year. With heavy defoliation, and the consequent check in growth, this becomes particularly difficult when injury is repeated year after year and possibly results finally in the death of the tree. In such cases, with narrow or imperfect rings, and possibly entire absence of a ring, it may become impossible to assign dates. It has been necessary to discard many sections on this account.

Irving T. Guild, Gipsy Moth Investigations.

FLATHEAD BORER KILLING YOUNG CYPRESS IN SOUTHERN CALIFORNIA.

Mr. F. P. Keen reports a number of young Monterey cypress trees recently planted in the El Cajon Valley, San Diego, Calif., attacked and killed or seriously injured by a flathead borer. The borers, which were found in their pupal cells in the wood, appear to belong to the species Chrysobothris mixa. Some larger live trees close by had scars at the base which appeared to have been made by similar attacks in former years.

H.E. Burke.

SUGAR PINE CONTROL WORK SHOWS HANDSOME PROFIT.

Control seems to be a paying enterprise against the mountain pine beetle in sugar pine. At least that was the case with the work carried on by the Sugar Pine Lumber Company and the Forest Service on the Whiskey Creek tract of the Sierra National Forest. In May, 1924, $848.75 was spent in cleaning up the infestation on a tract of 9,600 acres of this timber. During the season following this work the loss of sugar pine on the control area declined 84 percent while on the surrounding areas there was an increase during the same period of 134 percent. On this basis the investment of $848.75 yielded a return of $8,494.87 in the value of timber saved. Not a bad investment if we accept these figures which are based upon a hundred percent cruise and the marking of all bug trees on the areas studied.

All the evidence at hand indicates that the mountain pine beetle responds much more readily to artificial control measures than does its near relative the western pine beetle in yellow pine. The White and Friant Lumber Company, during 1916 and 1917, carried out control measures on the same tract and secured very effective reduction of losses in the sugar pine.

It seems as though the difference in habits of the two species of beetles may have something to do with the difference in results of control which have been secured. It has been shown that the western pine beetle consistently picks out slower growing trees in its attacks. By so doing it is able to maintain itself in trees that are easily overcome. In a large series of sugar pine cores which have recently been studied it was found that the mountain pine beetle shows no tendency whatever toward selection of slower growing trees. This gives us some basis for the theory that, once the number of beetles have been reduced by artificial control work, they are still further held down by the resistance of the fast growing trees which the beetles attack but fail to kill.

J.M. Miller.

WHO OUR READERS ARE.

This number of the Western Forest Insect News consists of 93 copies, Thirty-one of these go to entomologists, 3 to forest pathologists, 23 to government foresters, 2 to state foresters, 2 to private foresters, 10 to National Park officials, 1 to Indian Service officials, 3 to forest protective associations and 18 to forest schools.

H.E. Burke.

COLOR AS AN INDICATION OF INFESTATION IN YELLOW PINE FORESTS.

A forest entomologist in viewing a body of yellow pine for the first time depends to a great extent upon his knowledge of color. Any change in the color of the foliage from normal green at once attracts his attention. Color is one of the most useful attributes in the location of infested trees. In a preliminary insect survey of extensive areas it is chiefly depended upon to supply the necessary data on which plans for intensive surveys are based. In a mountainous country where from points of vantage distant timbered areas can be viewed and discolored trees readily noted, it is possible, by noting the various colors of the foliage, to arrive at conclusions as to an increase or decrease of an infestation as well as an estimate of the yearly loss.

Yellow pine which is attacked by Dendroctonus ponderosae in August rarely if ever shows any change in the color of the foliage until the following year. During the past season on the Kaibab, National Forest, Arizona, a large series of infested yellow pine trees were closely observed and changes in the color of the foliage were recorded as they occurred.

Twenty infested trees with an average diameter of 25 inches in eight group infestations located at varying distances on a mile strip were constantly under observation. Every three or four days the color of the foliage was noted and compared with that of the trees in the group. The trees were attacked during August 1924 and the records covered the period from May 1 to September 19, 1925. The foliage of all infested trees remained green up to May 10. On the 11th only a few had faded. This fading was more marked after a tree had been felled, when it was found that there was a departure from the normal green color and that the leaves were a grayish green and dry. On the 18th a slight yellowing of a few trees was recorded. On the 22nd nearly all trees had faded and from the 24th to 27th they had a decided yellowish tinge. On June 15 all the trees were a decided yellow, on the 22nd a few were slightly sorrel. From July 16 to 23rd all were decidedly sorred in color and on the 30th a few were beginning to turn reddish. The line of demarcation between yellow and sorrel is difficult to assign to a specific date. However, a noticable change from yellow to sorrel was recorded after the end of June and all the trees could be classed as sorrel after the end of July. From August 12th to 20th most of the sorrel colored trees were decidedly reddish and from them on until the middle of September all the trees could be classed as Red Tops.

There are always a few trees which hold their green color well into July. After the first rains in July these trees change color very rapidly - sometimes within a few days. It is evident on reviewing the notes that on June 15 a marked change has taken place in 95% of the infested trees, the predominating color being yellow, but not a deep yellow.

This sorrel or deep yellow comes a month later at which time a slight reddish tinge can be observed. This is the beginning of the Red Top stage which predominates at the end of August.

It would appear that the period June 15th to July 31st is the logical time for field examinations if color of the foliage is to be considered as the basis upon which the location and amount of infestation is judged.

W.D.Edmonston.

FOREST INSECT CONTROL BY CONTRACT.

A rapid increase in the barkbeetle infestation in the timber of the Long-Bell Lumber Company situated in the Klamath Indian Reservation, Oregon, resulted in the inauguration of control measures by the Company in the spring of 1925. Previous to 1923 barkbeetle infestations on this area had been below normal and the timber losses from this source had been correspondingly small. The Company had, prior to 1923, started a small control project in the stands along the west border of the tract but finding the infestation very light the work was discontinued.

This infestation first became epidemic in 1923. The year 1924 witnessed a further increase and by 1925 the beetle losses had assumed such proportions that over 200 trees were killed per section.

Control work was started in early April and continued until late October. The work was contracted to Mr. J. H. Hamilton at $4 per tree treated. Mr. Chas. W. King, Forester for the Company, superintended the project. The Bureau of Entomology, through its field station at Ashland, Oregon, cooperated to the extent of inspecting the control work and giving advice relative to the entomological phases.

The project covered an area of 26,000 acres. A total of 4,273 infested trees, containing a volume of 3,763,340 board feet, were treated at a cost of $17,092.00 The control work was divided into three separate periods; spring, summer, and fall. During the spring period, from April 8 to July 1, 3,274 trees, containing overwintered broods which developed from fall attacks of 1924, were treated. During the summer period, July 1 to August 20, 429 trees, containing broods developing from the first seasonal attacks of 1925, were treated. 570trees infested with broods developed from summer and fall attacks were treated during the fall period, which lasted from September 5 to October 28. The barkbeetles; Dendroctonus brevicomis, Dendroctonus monticolae, Ips oregonis, and Ips emarginatus were all involved in this infestation. The trees treated were all western yellow pine.

The results of the control work, so far as can be ascertained at the present time, are very satisfactory. An examination made last fall indicates that the losses over the entire area worked have been greatly reduced. Further control work is proposed for the current year, in order to clean up some outlying infestation and to secure permanency of the work already done.

J.E. Patterson.

QUERIES AND ANSWERS

We are starting this section of the letter to arouse discussion on many of the questions that continually arise in all forest insect work. If you have any question pertaining to forest entomology send it along and we will try and submit it to our readers. Only a limited number can be included in each issue so we reserve the right to select the one we believe will arouse the most profitable discussion. The questions and answers will be numbered to correspond.

H.E. Burke.

No. 1. - The public mind is often vastly confused by the contradictory statements issuing from various branches of the federal government. The tendency is to think of the government as one central mind issuing advice and knowledge with great clarity of vision and singleness of purpose. Then when they read that "the government says eat more meat" and "the government says meat is unhealthy"; "the government says there are too many deer on the Kaibab"; and "the government says there are not too many deer on the Kaibab" and "the government says most of our timber losses are caused by fire" and "the government says forest diseases cause the greatest loss of timber of any other known agency", and "the government says forest insects kill more timber than all other agencies put together". Can you wonder that the public begins to think that the government is just talking and doesn't know what it is talking about. People never stop to realize that the government is not one collective mind abounding with authoritative wisdom, but a great group of individual minds each with its pet idea and honest opinions. The result is of course inevitable.

Is it possible then for us to answer the question:-

What is the unbiased truth concerning the relative importance of fire, disease and insects as destroyers of our forest timber crop? And in what forest types do each play the major role?

F.P. Keen.

No. 2 - If the Entomologist Fails Call a Botanist.

The very close association between insects and plant life is a well recognized principle of ecology. Often the host plant may be used to determine the insects associated with it. In some cases this principle may be reversed and the plants themselves determined by first determining the insects.

A good example of this is the case of Jeffrey pine and Western Yellow pine. Often when these trees are found closely associated it is difficult to separate the Jeffrey from the yellow pine. If however, the trees are attacked by barkbeetles, there is no question about the difference if the beetles are determined. The Jeffrey pine beetle attacks nothing but Jeffrey pine and the Western pine beetle attacks the yellow pine but never the Jeffrey. (Does anyone know of an exception?) On the other hand, the western pine beetle attacks Coulter pine. Is this not a good indication that Coulter pine is phylogenetically more closely related to western yellow pine than it is to Jeffrey?

Again, some dendrologists now call the yellow pine of the Rocky Mountain region Pinus brachyptera. If this is a good plant species are not the barkbeetles which infest it (Dendroctonus barberi) and (Dendroctonus ponderosae) very likely to be good insect species quite distinct from those in Pinus ponderosae. (Dendroctonus brevicomis and D. Monticolae). Biologically these insect species appear to be quite distinct. What do the taxonomists think about it?

F.P. Keen.

THE PALES WEEVIL

The Pales weevil is still doing considerable damage to young pine seedlings both natural and planted when these are near a recent cutting. A series of cages is being studied at the Harvard Forest to determine the effect shade has on the severity of injury. This work will probably be concluded next summer. The means of control in clear cut areas is to refrain from planting for three years after the cutting operation. Nothing definite is known for shelterwood or selection cuttings.

H. J. MacAloney.

WHERE ARE WE?

Most of the questionaires sent out with the February number have been returned and it is time to decide whither we are going.

Our readers evidently fall into two distinct classes: those, mostly foresters, who read from the strictly news standpoint and want all of the articles short and pertinent; and those, mostly forest entomologists, forest pathologists, forest experiment station workers and forest school teachers, who want any and all information obtainable on forest insects and are willing to take all that we can give them and still "holler" for more.

Can we satisfy both classes? We can try.

In this number and succeeding ones we intend to have four to six or more pages of the shorter news-like articles. Following these we shall have the longer more report-like material. We may bind them separately. You may read either or both.

Most of you want the news letter every month. As it does not seem possible to fill this want we shall do the best we can to issue numbers for October, November, December, February, March, April, May, and in midsummer probably about August 1st.

Remember that you make the news. We pledge you that we shall do our part if you do yours.

H.E. Burke.